2023 10-Year Assessment Preliminary Study Design

Stakeholder and Customer Webcast

PRESENTED BY

System Planning

November 7, 2022

AMERICAN TRANSMISSION COMPANY®

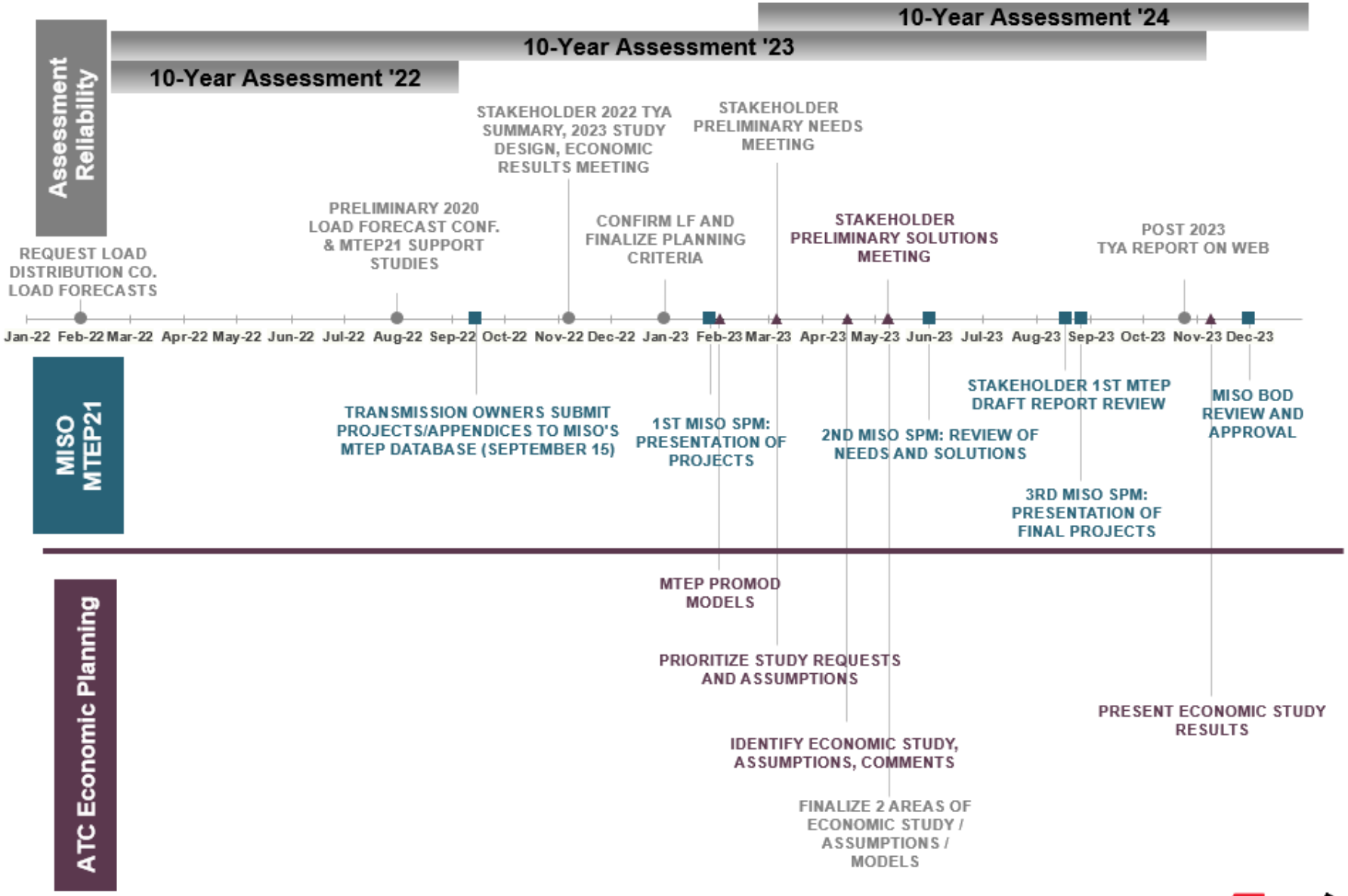
Purpose

- Summarize ATC's project development processes
- Solicit input for the 2023 Assessment Study Design
- Solicit input on any new Public Policy Requirements

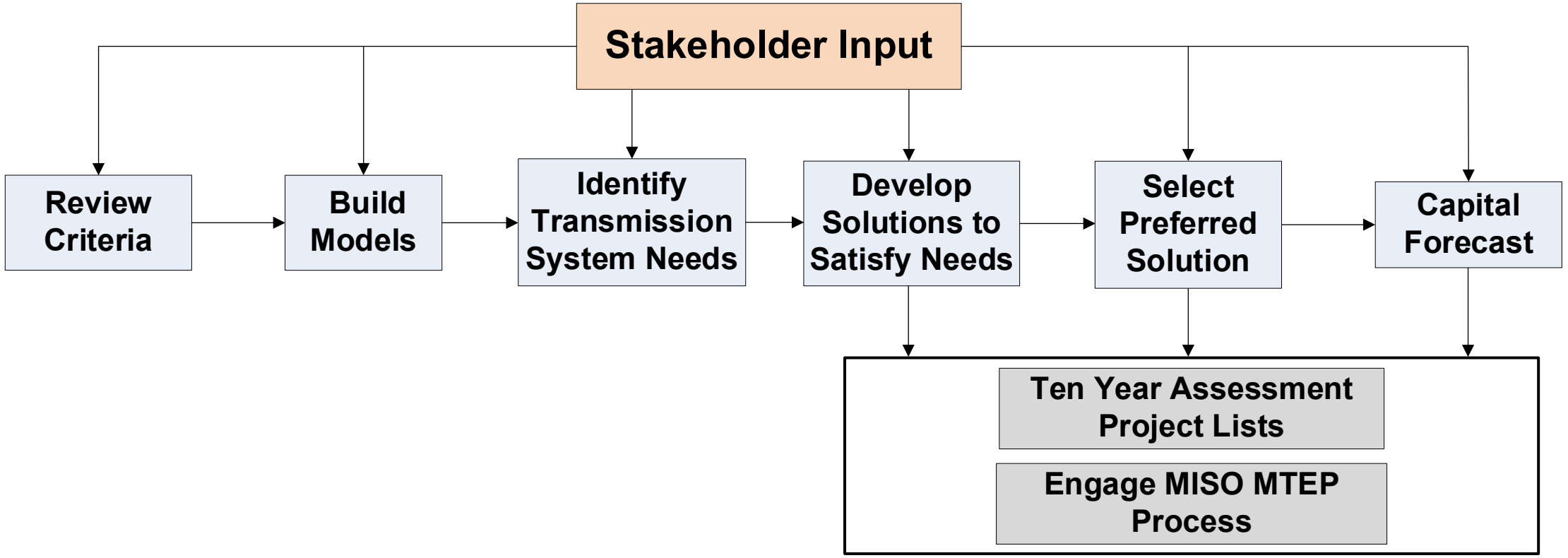
ATC's project development processes

- Local Transmission Planning
  - Asset Renewal
  - Interconnections
  - Network
    - Planning Reliability Criteria
    - Sectionalizing Guidelines
  - Economic Benefits
- Consider Other Solutions (Non-Transmission Alternatives)
- Regional Planning
- Public Policy Requirements

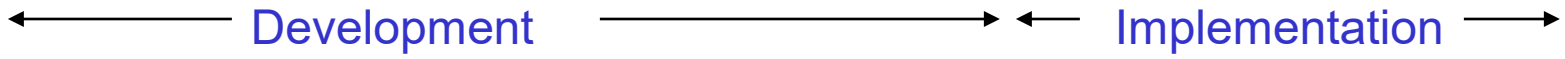
Timeline


10-Year Assessment '24
10-Year Assessment '23
10-Year Assessment '22
Assessment Reliability
STAKEHOLDER 2022 TYA SUMMARY, 2023 STUDY DESIGN, ECONOMIC RESULTS MEETING
STAKEHOLDER PRELIMINARY NEEDS MEETING
PRELIMINARY 2020 LOAD FORECAST CONF. & MTEP21 SUPPORT STUDIES
CONFIRM LF AND FINALIZE PLANNING CRITERIA
STAKEHOLDER PRELIMINARY SOLUTIONS MEETING
POST 2023 TYA REPORT ON WEB
REQUEST LOAD DISTRIBUTION CO. LOAD FORECASTS
Jan-22 Feb-22 Mar-22 Apr-22 May-22 Jun-22 Jul-22 Aug-22 Sep-22 Oct-22 Nov-22 Dec-22 Jan-23 Feb-23 Mar-23 Apr-23 May-23 Jun-23 Jul-23 Aug-23 Sep-23 Oct-23 Nov-23 Dec-23
MISO MTEP21
TRANSMISSION OWNERS SUBMIT PROJECTS/APPENDICES TO MISO'S MTEP DATABASE (SEPTEMBER 15)
1ST MISO SPM: PRESENTATION OF PROJECTS
2ND MISO SPM: REVIEW OF NEEDS AND SOLUTIONS
STAKEHOLDER 1ST MTEP DRAFT REPORT REVIEW
MISO BOD REVIEW AND APPROVAL
3RD MISO SPM: PRESENTATION OF FINAL PROJECTS
ATC Economic Planning
MTEP PROMOD MODELS
PRIORITIZE STUDY REQUESTS AND ASSUMPTIONS
IDENTIFY ECONOMIC STUDY, ASSUMPTIONS, COMMENTS
FINALIZE 2 AREAS OF ECONOMIC STUDY / ASSUMPTIONS / MODELS
PRESENT ECONOMIC STUDY RESULTS

ATC project identification process



ATC project status definitions



Strategic

Provisional

Proposed

Planned

In-Service

Asset renewal program objectives

- Safety – public and worker
- Minimize total life cycle cost [Net Present Value of Revenue Requirements (NPV RR) from customer cost/rate perspective]
- Compliance
- Manage risk
- Reliable performance – maintain or improvement
- Environmental performance improvements
- Coordination with Stakeholders

Replacement is based on...

- Safety – public and worker
- Condition – tests, maintenance costs/risks
- Obsolescence – part availability, factory support, craft labor expertise with this specific equipment, available spares
- Utilization – application, system changes
- Criticality – consequence of failure, outage impacts
- Costs – maintenance and replacement
- Environmental – PCB contamination, oil volumes and containment, proximity to waterways, SF6 gas leaks, lead, mercury, environmental compliance/risks
- Compliance – NERC, CIP, EPA, State DNR
- Other Considerations – test frequency, on-line monitoring, test information available, fleet size, common fleet issues, maintenance history, failure mode, industry experience

Asset renewal considerations

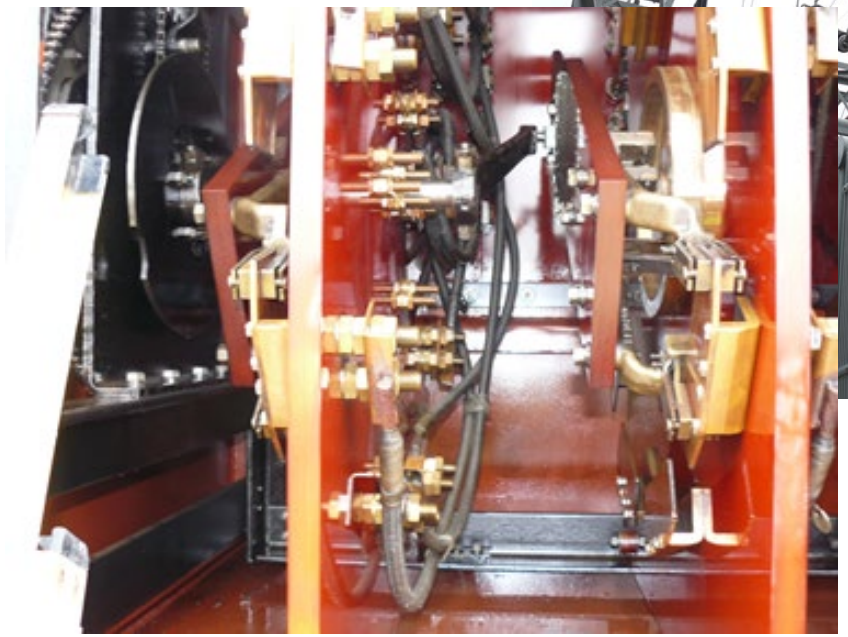
- Is the asset still needed?
  - Assess area needs
  - Obtain cross-functional and distribution provider input
  - Consider removal of lines/equipment
  - Consider system reconfiguration
  - Other alternatives
- What ratings and performance are needed?

Asset Renewal T-line Project Example

- Portage – Dam Heights 69kV Rebuild (Y-16)
  - Project Background
    - Approximately 25 of miles of rebuild
  - Past Needs
    - Condition and Performance Issues
    - Replace 1910's vintage lattice structures
    - Outages: One of the most frequently outage ATC lines
      - ✓ On average about 4 outages per year
      - ✓ Need to update to avian friendly design
      - ✓ Improved lightning performance
  - Current status
    - Project went in-service Fall of 2017
    - One momentary outage in 2021 due to lightning above design (69kV – 45kA design, actual strike 192kA)

Lancaster Power Transformer – Life Cycle

- Allis Chalmers Power Transformer built in 1954
- Life Extension – 2015
  - High Voltage Bushings
  - Load Tap Changer bypass
  - Oil Seal Gaskets
- Planned Retirement 2025 after LDC distribution buildout



Interconnections

- G-T
  - MISO Attachment X and Y Processes
- D-T
  - Collaborate with distribution providers through Load Interconnection Request Form (LIRF) and BVP process
- T-T
  - Collaborate with other Transmission Owners

Network planning objectives

- Compliance with North American Electric Reliability Corporation (NERC) regional and local criteria
- Best Value Planning (BVP) process
- Customer involvement
- Address Public Policy requirements
- Maintain or improve the adequacy and reliability of the electric transmission system

Planning Criteria

- NERC Standards, particularly TPL-001, Version 5

- ATC Planning Criteria
  - Consists of criteria and assessment practices
  - http://www.atc10yearplan.com (About tab)
  - Current versions: Planning Criteria v22.1& Planning Assessment Practices v22.1
  - Planning Criteria v22 & v22.1
    - v22 (June 2022)
      - ✓ Rewritten “Steady State Criteria and Implementation” in the tabular format
      - ✓ Non-Consequential load shed not allowed in-between P6 event
    - v22.1 (September 2022)
      - ✓ TPL-001-5 compatibility related edits to P5, known outage and long lead time equipment
      - ✓ Added Resource Facility Requirements Section: IBR Reactive Power Design Capability, IBR Momentary Cessation, IBR Power Priority Mode, IBR Performance Requirements
      - ✓ Added IBR EMT Model Requirements Section and Verification Process
      - ✓ Updated Voltage Fluctuation and Flicker and Harmonic Voltage and Current Distortion Sections

Planning Criteria

- Planning Assessment Practices v22 & v22.1
  - v22 (June 2022)
    - ✓ Updated Wind Generation Dispatch Methodology and Solar Generation Dispatch Methodology
    - ✓ Updated Non-BES Generating Unit Stability
    - ✓ Updated Generator Interconnection Studies section
  - v22.1 (September 2022)
    - ✓ Update Dynamic Load Modeling
    - ✓ Update Multiple Contingency Planning
    - ✓ Update Other ATC Interconnection Studies and Considerations
- Sectionalizing Guidelines
  - Developed with distribution providers early in ATC's history
  - http://www.atcllc.com/wp-content/uploads/2017/12/Load-Interconnection-Guide-Rev-7-121517-Pub.pdf (Sections 3.6.1-3.6.2)

2022 studies and assumptions

- Preliminary 2022 Load Forecast Confirmation and MTEP23 Support Studies
- Modeling Assumptions
  - Model Years
  - Load
  - Generation
  - No Load Loss Allowed Contingency Analysis
- Additional Studies

Preliminary load forecast and MTEP23 support studies

- Initial screening (reduced generator reactive capability)
  - Summer peak (5 and 10 year models)
  - 2022 load forecast
  - 2022 TYA outside world (2021 MMWG cases)

- To confirm 2022 Load Forecast and support MTEP23 database development
  - No load loss allowed contingencies
  - Completed August 2022

2023 TYA model years

- 2023 (As-planned)
- 2024
- 2028
- 2033

- All models will likely be completed by the Spring of 2023

2022 Load Forecast- Historical

- Requested October 30, 2022
  - ATC's 2022 summer peak hour
  - ATC's 2021-2022 winter peak hour
  - Light load
  - Shoulder load

- Requested by November 1, 2022.

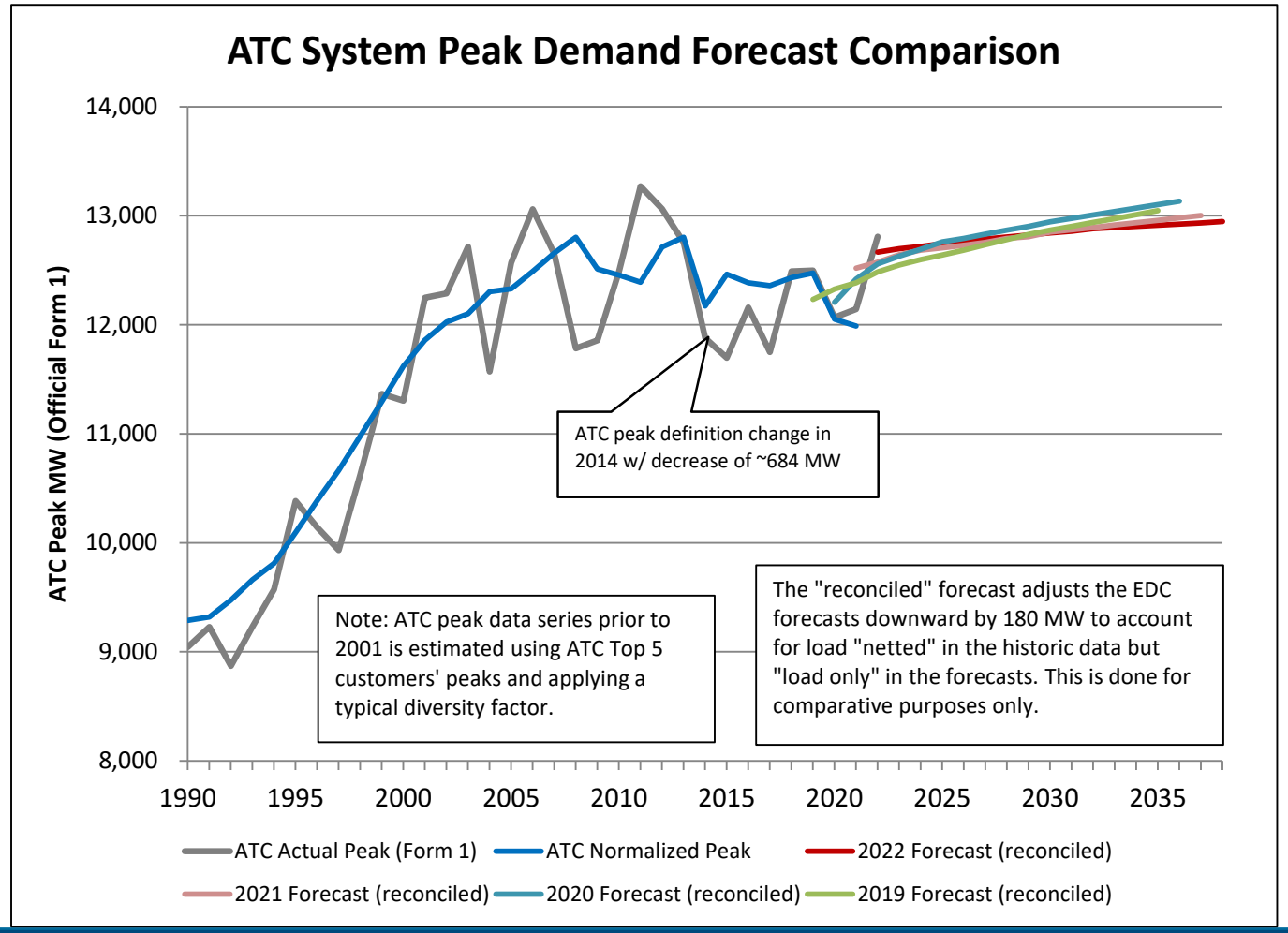
- Compile, review, and add to the existing load databases

2022 Expected forecast for TYA 2023

- Requested LDC forecasts in February 2022
  - 11 years per D-T IA
  - Consistent with resource planning forecast
  - Expected (50/50 probability)
- Received in April 2022
- ATC compares forecasts to previous forecasts and historic data
  - Notable differences are confirmed with the LDCs and revised if needed
  - Finalized copy of forecast provided to LDCs in August 2022
  - Forecasts incorporated into the 2023 TYA to plan the system

ATC 2022 Load Forecast Comparison

Comparisons of ATC TYA Forecasts



Annual growth rates
(2022-2032 for all)

2019 Forecast: 0.35%
2020 Forecast: 0.35%
2021 Forecast: 0.25%
2022 Forecast: 0.17%

ATC Load Forecast Growth by Zone
2022-2032 Annual Growth Rates

	Forecast Year			
Zone	2022	2021	2020	2019
Zone 1	0.1%	0.3%	0.4%	0.4%
Zone 2	0.5%	0.2%	0.3%	0.2%
Zone 3	0.3%	0.3%	0.5%	0.6%
Zone 4	0.0%	0.1%	0.2%	0.2%
Zone 5*	0.1%	0.2%	0.4%	0.3%
ATC Total	0.17%	0.25%	0.35%	0.35%

*Zone 5 influenced by Mt. Pleasant growth

Note: These growth rates all use 2022-2032 period, not first 10 years of each

Load forecast trends, (*Continued)*

Model	ATC Load (MW)		
	2020 Assessment	2021 Assessment	2022 Assessment
Year 1 Summer Peak	12,600	12,700	12,800
Year 5 Summer Peak	+200	+300	+100
Year 10 Summer Peak	+400	+400	+300
Year 5 Shoulder	9,100	9,300	9,100
Year 10 Shoulder	+100	+200	+100

Generation modeling

- Existing generator data
  - Annual updates requested from Generator Owners (GOs) in Q3
- Generation additions
  - Only add generators with signed interconnection agreements (IAs)
  - Additions modeled at MISO Facility study location
- Generation retirements
  - Generators with a completed MISO Attachment Y are modeled as retired, unless there is a System Support Resource (SSR) agreement
- Under intact system and outage conditions
  - Generators are limited to:
    - 90% of maximum reactive power output and
    - 90% of maximum reactive power consumption

Generation dispatch

- Local Balancing Area (LBA) merit order dispatch:
  - Used in Assessment's summer peak and shoulder models.
  - Provided by LBAs
- ATC-wide merit order dispatch:
  - Used in minimum load models
  - ATC-wide merit order dispatch determined using PROMOD
- Generators without scheduled transactions:
  - If they have signed IAs, generator included in the host LBA.

No load loss allowed contingency analysis

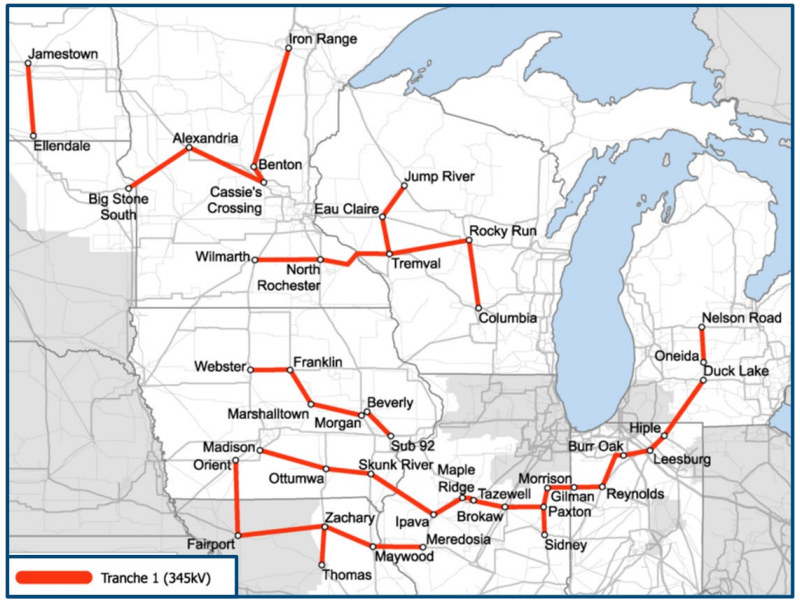
- Peak
  - 1, 5, and 10 year out models
- Shoulder (firm)
  - 5 and 10 year out models
  - 70% load except for Zone 2 (90% load) and northern Zone 4 (80% load)
  - Shoulder rating methodology
- Minimum load
  - 1 and 5 year out model
  - 40% load, may be adjusted based on analysis of historical loads

Additional network planning studies

- Load Loss Allowed
- Existing Generator Stability Reviews
- Annual Fault Study
- Sensitivity Studies

Long Range Transmission Plan (LRTP)

- MISO led initiative, under the Reliability Imperative
  - Transmission solutions to provide reliable and economic energy delivery for a reliable energy future
- 4 Tranches planned
  - Tranche 1
    - Approved by the MISO Board retroactively to MTEP21 in 2022
    - Portfolio of 18 projects for $10.3 B
    - ATC ownership share in 3 projects
  - Tranche 2
    - Under development and study, ATC actively participating
- Latest information available at MISO's LRTP Page



Projects Flow from the TYA to MTEP

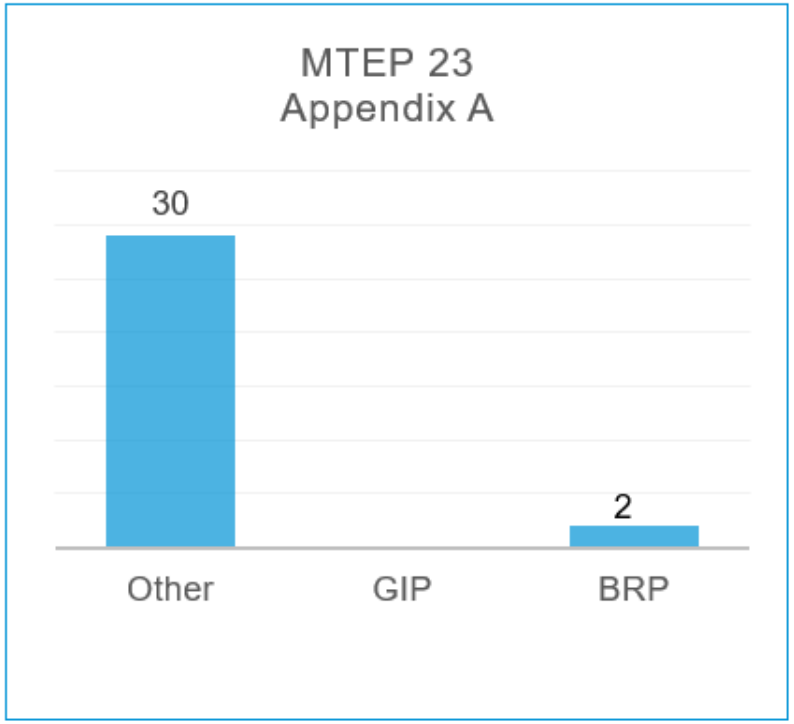
- Projects developed in the 2022 TYA process will be included in the MTEP23 process a list of those projects can be found in the 2022 TYA Project List

- Projects that may develop subsequent to the 2022 TYA process would be included on the project list and will be submitted into MTEP23.

- MISO Active Project List

MTEP23 - Summary

- Appendix A Projects
  - Count: 32
  - Total: $349,299,597
- New Appendix B Projects
  - Count: 9
  - Total: $ 298,720,000
  - + 4 programs (2025)
- Remaining Appendix B Projects
  - Count: 9
  - Total: $ 143,700,000



Non-Transmission Alternatives (NTAs)

- ATC and MISO work together in the TYA and MTEP processes to provide Stakeholders an opportunity to provide NTA Feedback on Projects
- MISO will post a list of NTA eligible projects as part of their Subregional Planning Meeting (SPM) #1, in January of 2023.
  - MISO will accept stakeholder project alternatives through May 31, 2023.
  - Best candidates for NTA consideration are MTEP Appendix B and Target Appendix B projects.
  - Stakeholders should submit alternatives to MISO's MTEP SPM contact, who is Greg Plauck.

Regional planning

- MTEP
- MISO's Coordinated Seasonal Assessments
- Reliability First's (RF's) Seasonal Assessments

Public policy requirements

- Follow MISO Tariff (Attachment FF) Processes
- Previously identified requirements
  - State Renewable Portfolio Standards (RPSs)
  - EPA regulations
  - State mandates and goals for energy efficiency (EE) and demand side management (DSM) programs
- We are asking for any feedback on whether there are additional public policy requirements we need to be made aware of.

Schedule

- Expected Load Forecast – Review complete August 2022
- Preliminary MTEP23 Support Study – Done
- Post 2023 TYA Preliminary Study Design Presentation – Done
- Stakeholder Preliminary Study Design Meeting – November 7, 2022
- Stakeholder Study Design Comments Due – November 30, 2022
- Study Design Completion – December 2022
- Preliminary Needs Meeting – March 2023
- Preliminary Solutions Meeting – May 2023
- Document and Publish – October 2023

Thank you for participating

To provide solicited comments or for more information, please contact:

Allison Bartz (abartz@atcllc.com)
or
Ted Weber (tweber2@atcllc.com)

by November 30, 2022

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